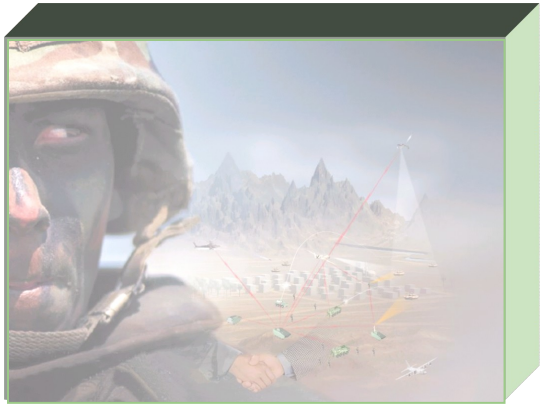
Future Combat Systems

FCS Advanced Collaborative Environment (FCS ACE): Architecture Overview



Presented:

9 January 2003

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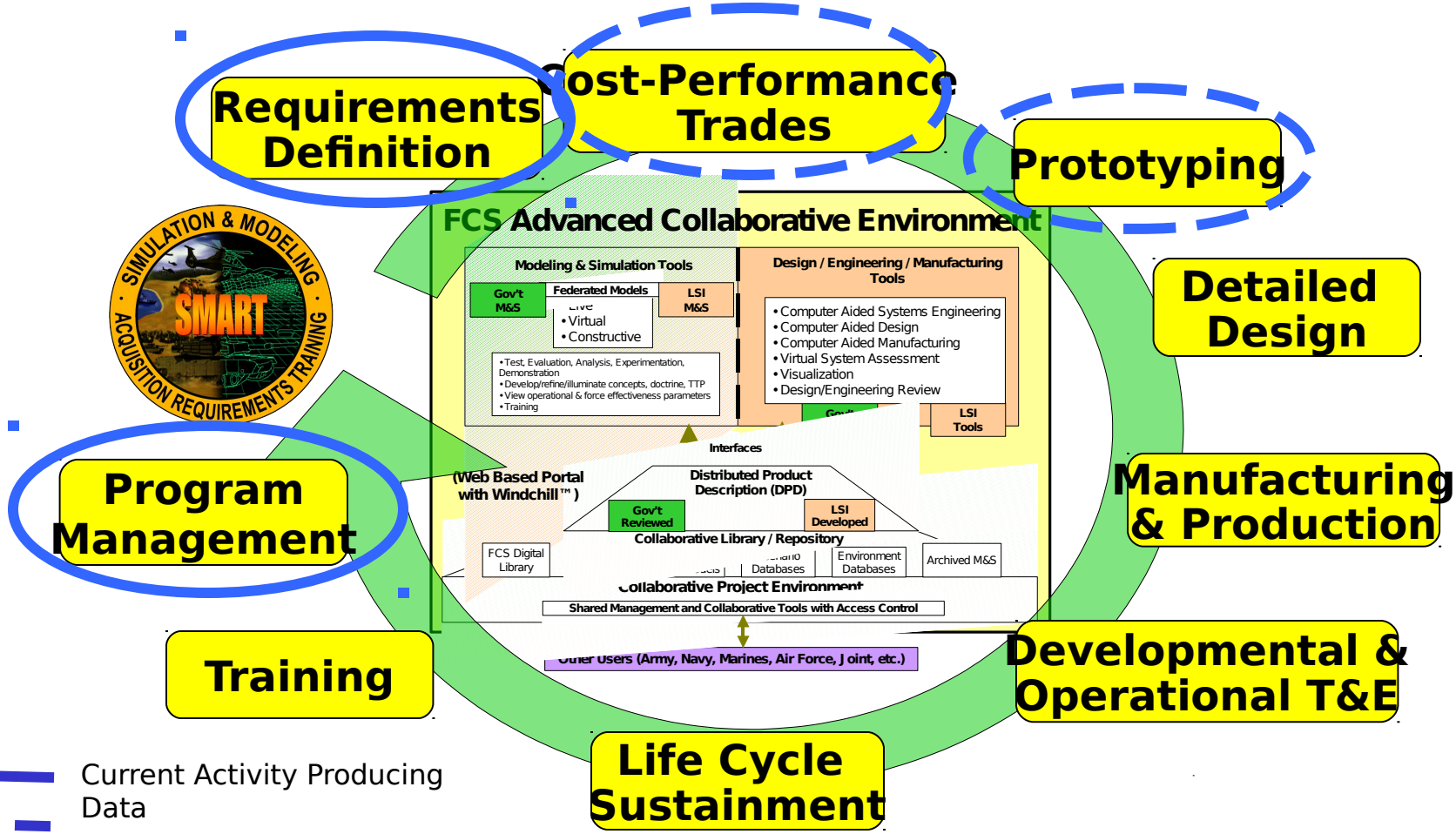
Topics for Discussion

- **FCS SMART Concept**
- **Review of LSI Agreement**
- **Review FCS ACE Architecture**
  - **Distributed Product Description**
  - **Traceability of Requirements to Product**
  - **Connection to AMSAA Data Portal**
- **Summary & Discussion**

***Live* FCS ACE Demonstration**

FCS SMART Concept
= Reuse of data for all activities

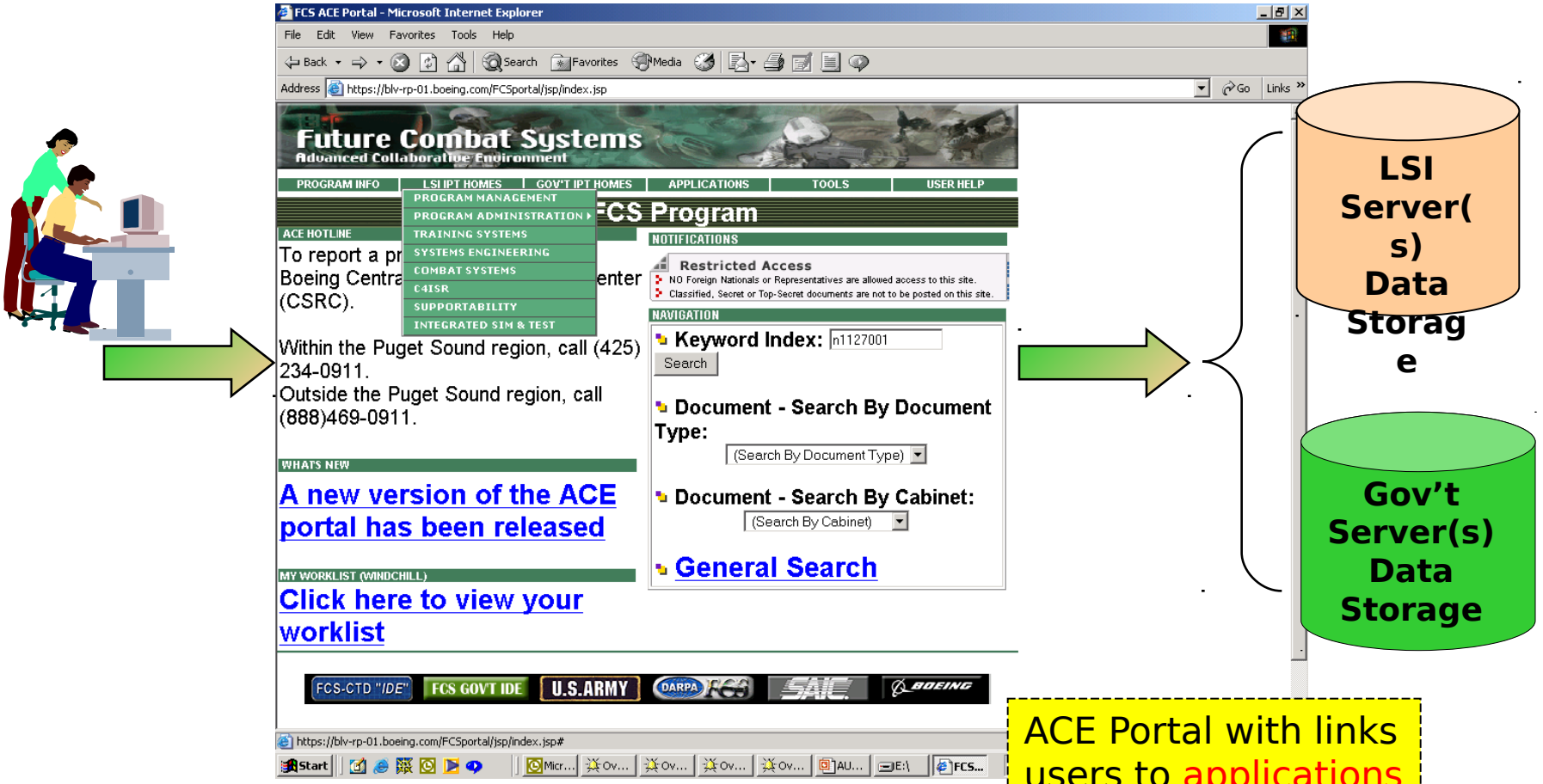


Current Activity Producing Data

Near Term Activity

Field FCS-Equipped Units of Action With Threshold Objective Force Capability by the End of the Decade.

ACE Portal is Web Accessed



ACE Portal with links users to applications AND data for: Project Mgt, Library Mgt, Risk Mgt, EVMS, Action Tracking etc

Topics for Discussion

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FCS Agreement & FCS M&S

- **1.2.1 Life Cycle M&S Support:**

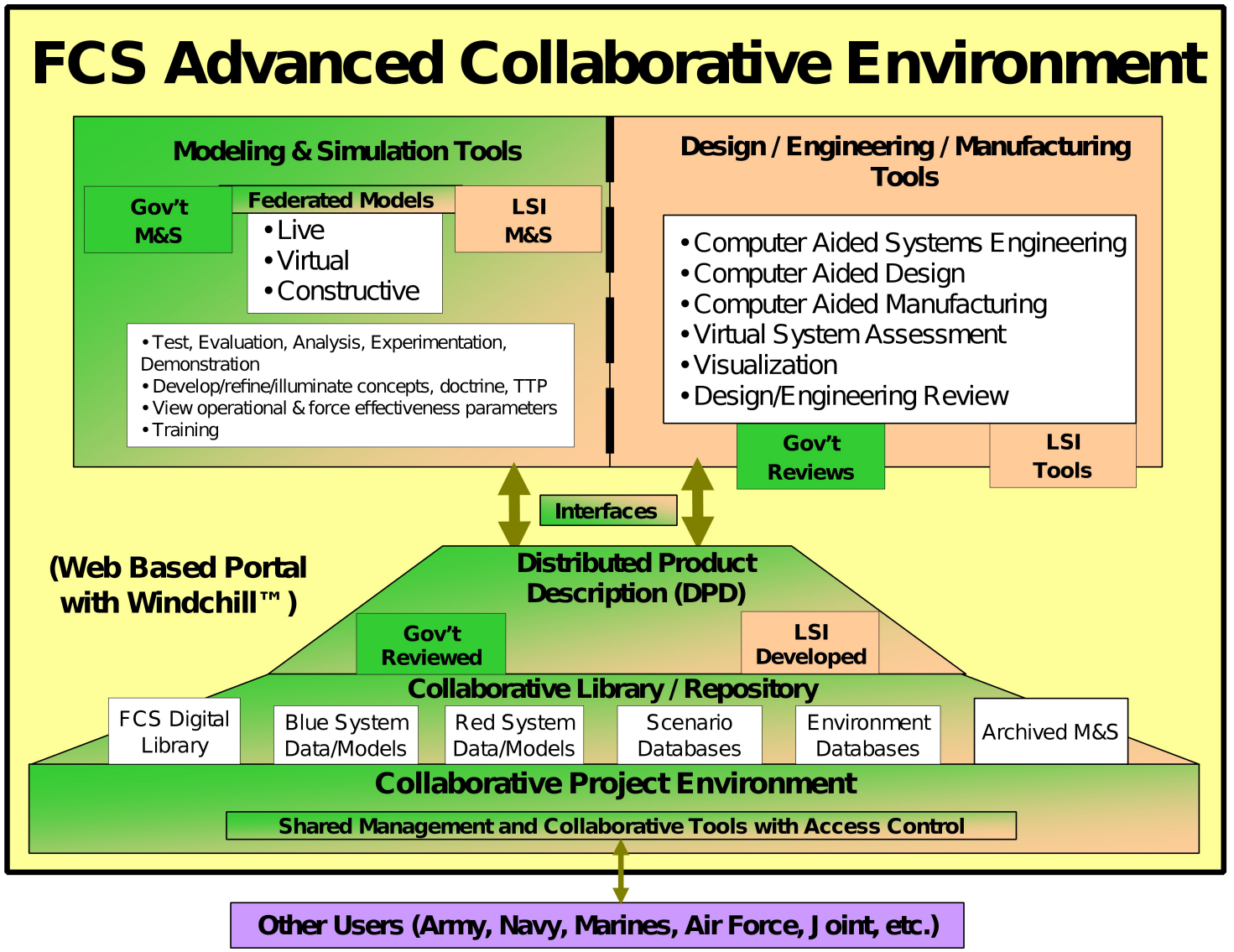
The LSI will develop and execute a life cycle modeling and simulation (M&S) program in accordance with the SMART framework. Prepare and deliver in digital format, specification(s) and graphics package(s) to support the Government's M&S objectives as described in Attachment 3. The M&S program shall operate within the ACE. The implementation of SMART shall encompass requirements definition, analysis of alternatives, prototyping, detail design, developmental and operational test and evaluation (to include virtual, live, and constructive approaches), manufacturing, production, sustainment, and training, and other items as defined by Boeing to support M&S objectives. This program will leverage both Government and LSI managed resources, and include analysis in the areas of cost, schedule, performance, and supportability.

FCS Agreement & FCS ACE

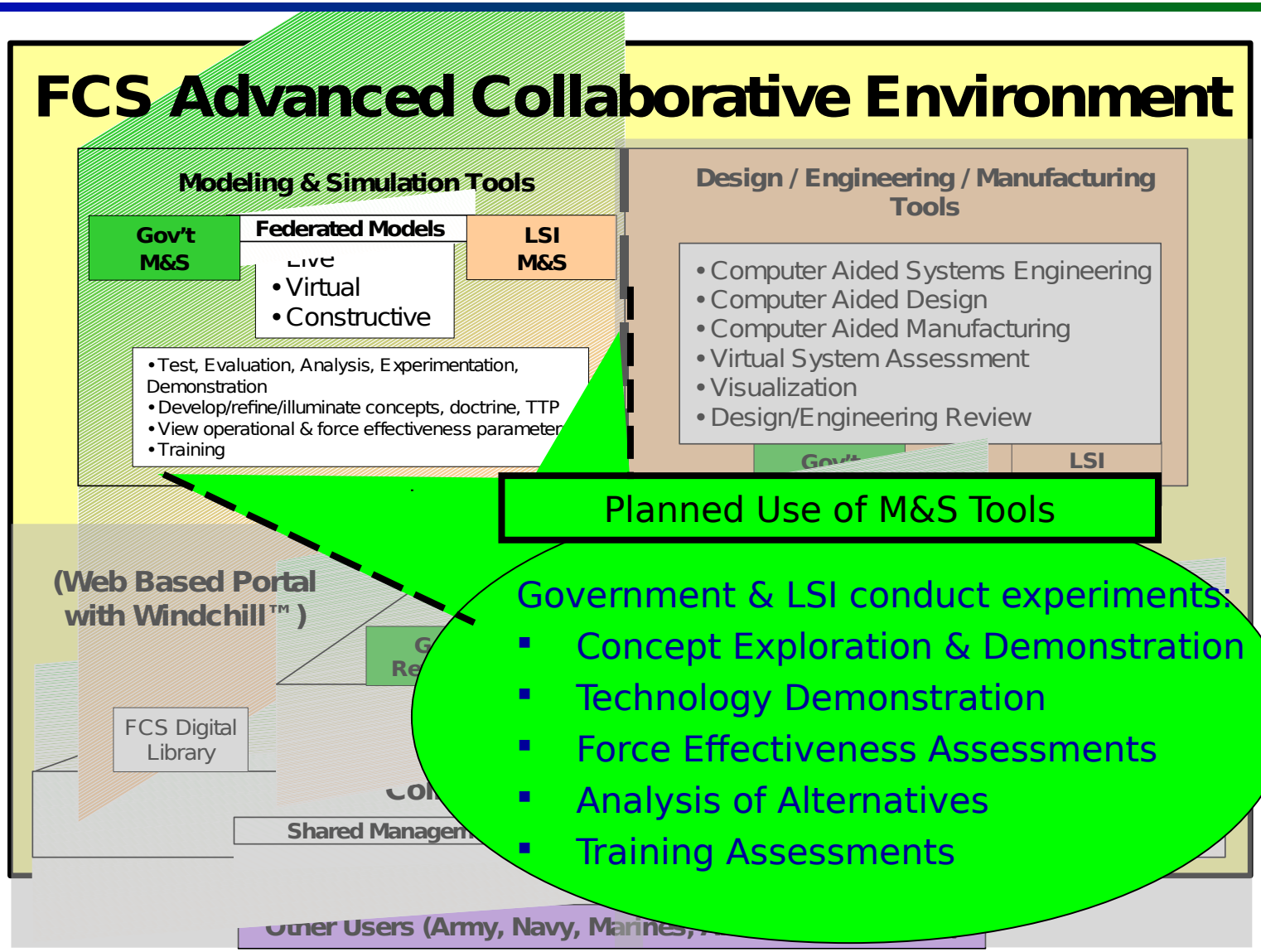
- **1.5.2 Advanced Collaborative Environment (ACE):**

The LSI in coordination with the Government will establish an Advanced Collaborative Environment. The ACE shall encompass shared data, tools, models, simulations, and the ability to access information and data based on logical business rules throughout the FCS enterprise. The ACE is designed to connect people and information to facilitate the execution of the program. It facilitates real-time collaborative program management. The LSI and the Government will provide joint access to tools, models, simulations, data, and information. All classified data and information utilized throughout the ACE shall be handled in accordance with the secure environment procedures outlined in DD Form 254.

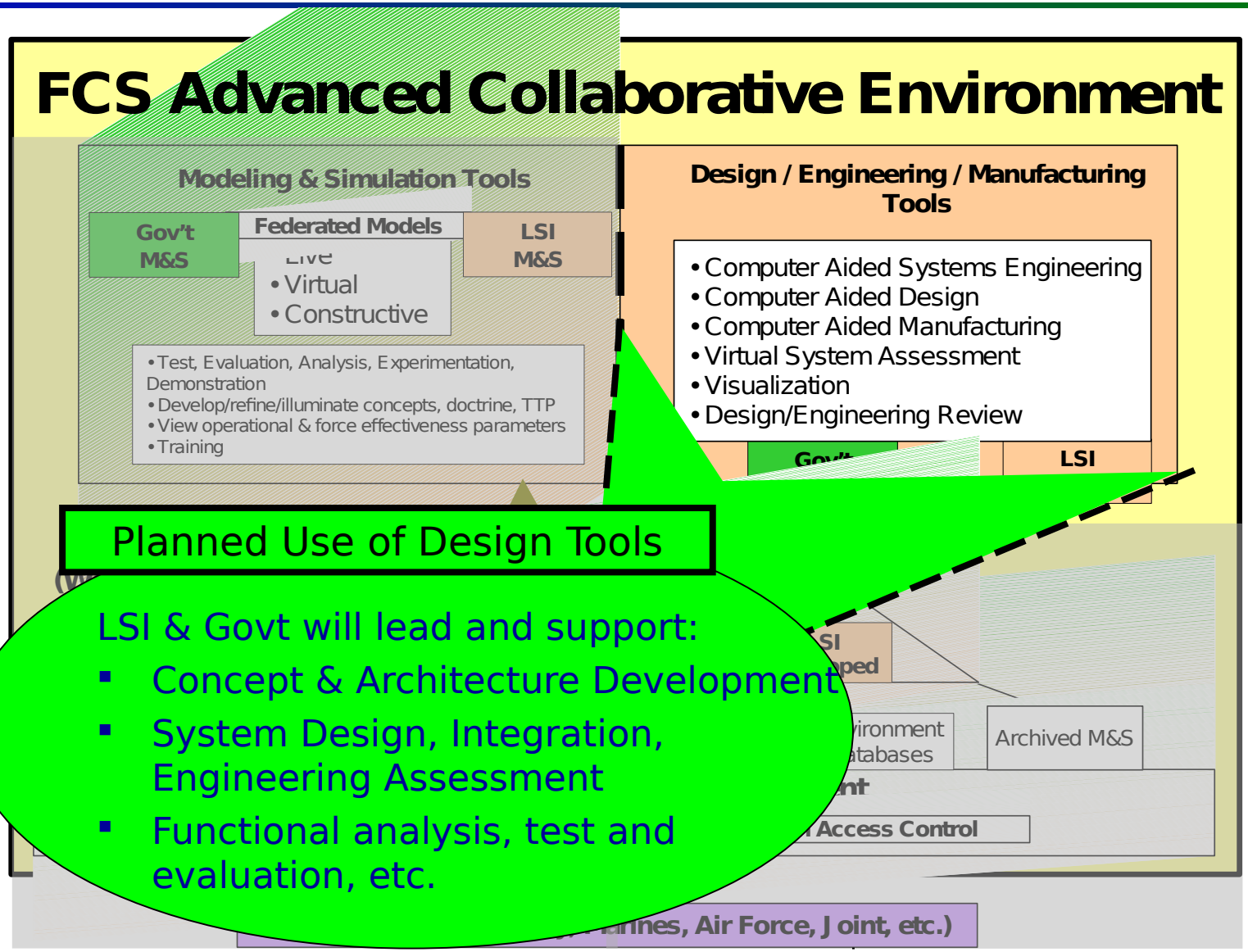
Current FCS ACE Diagram



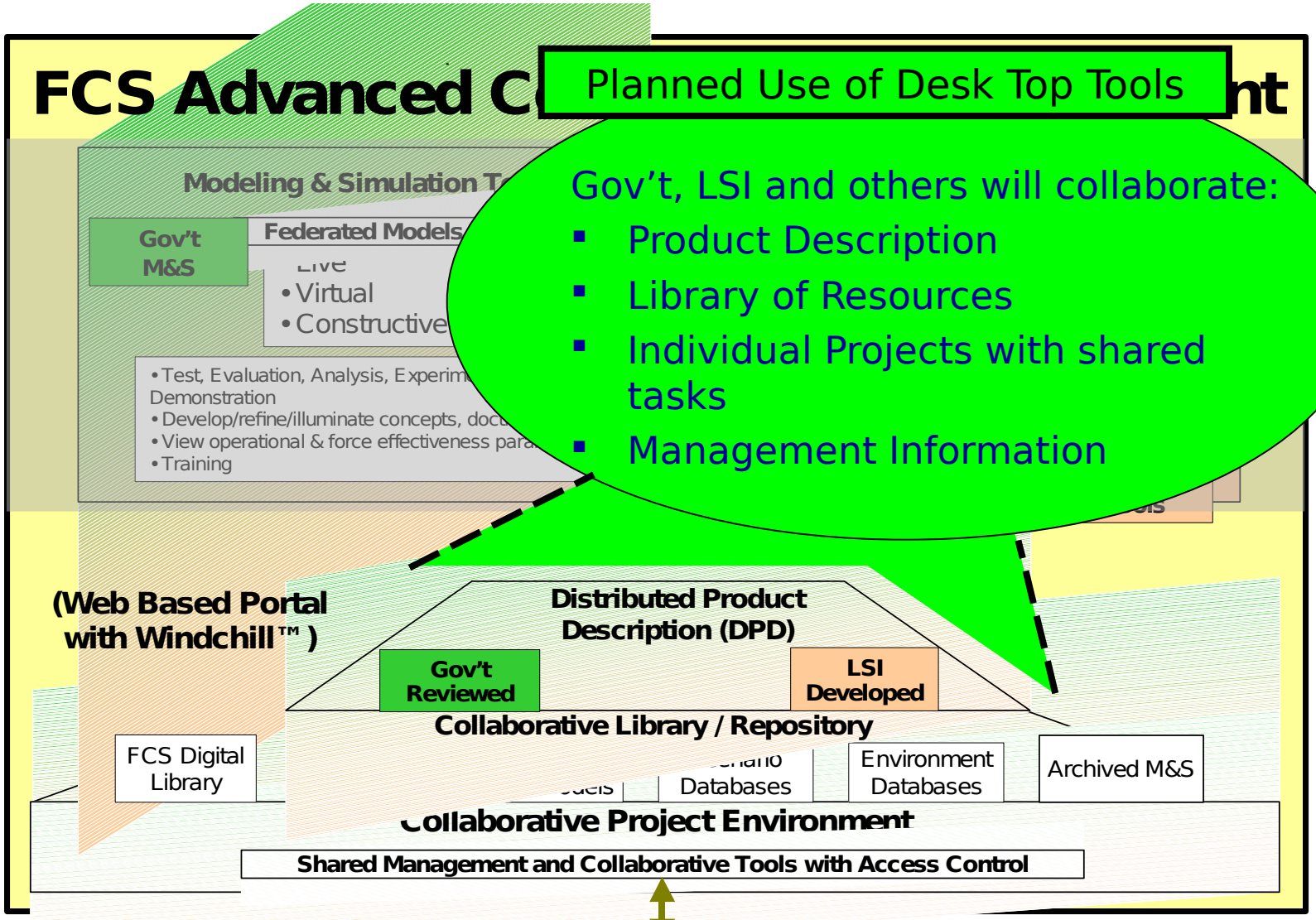
FCS ACE Usage of M&S Tools



FCS ACE Usage of Design Tools



FCS ACE Usage of Desk Top Tools



FCS ACE = Collaboration For Modeling & Simulation

- On-line planning, tasking, monitoring, synchronizing of M&S Events
- Streamline data preparation & accreditation
- Configuration Management of Models
- Fast delivery of output in useful form
- Traceability from requirements to decisions

Topics for Discussion

- FCS SMART Concept
- Review of LSI Agreement
- **Review FCS ACE Architecture**
  - **Distributed Product Description**
  - Traceability of Requirements to Product
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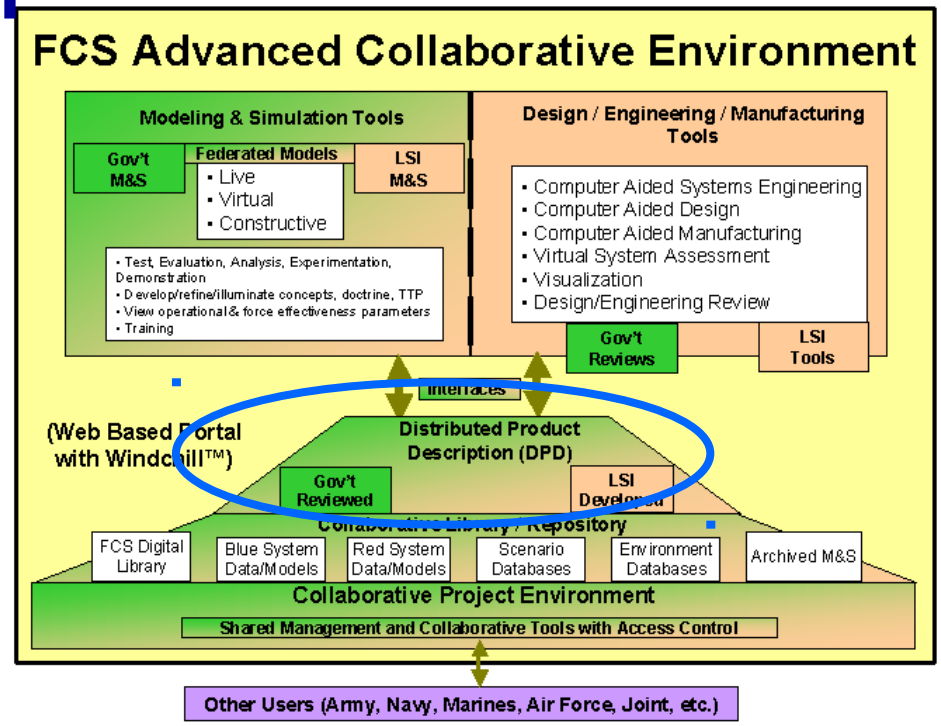
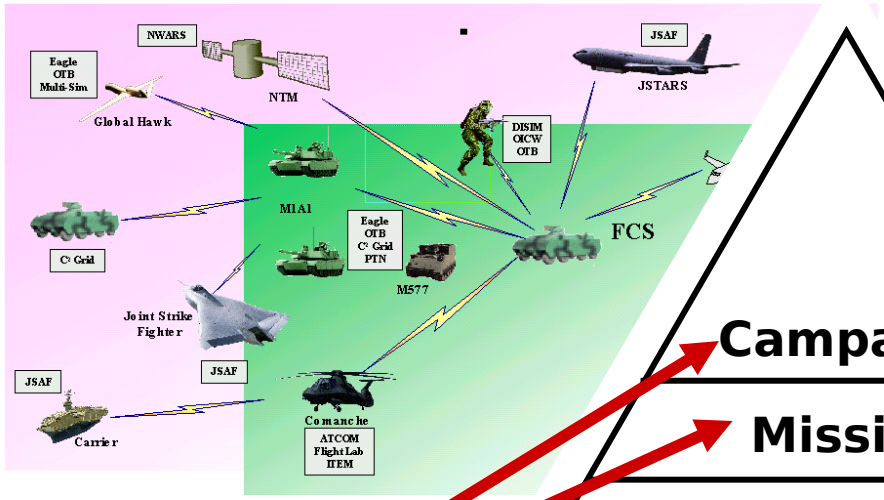
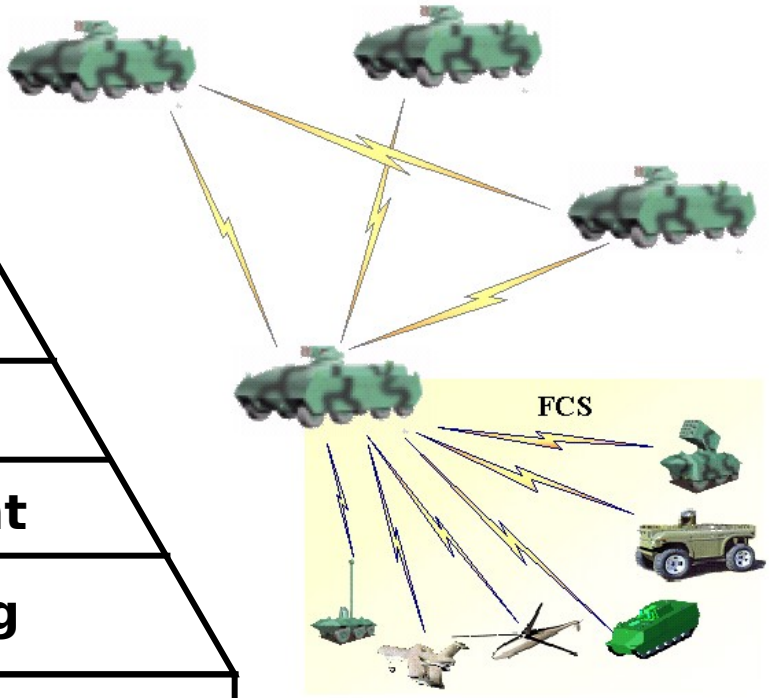
FCS Distributed Product Description (DPD)

- ✓ **Single Authoritative Source for FCS System Description Data**
- ✓ **Maps Relationships Between M&S Data, Models, and FCS Product Structure**
- ✓ **Provides Work Management Services for PMO Review & Certification of M&S Results**



FCS DPD Scope
All Levels of FCS Modeling, All FCS Designs





Campaign

Mission

Engagement

Engineering

Systems & Subsystems

Techniques & Technologies

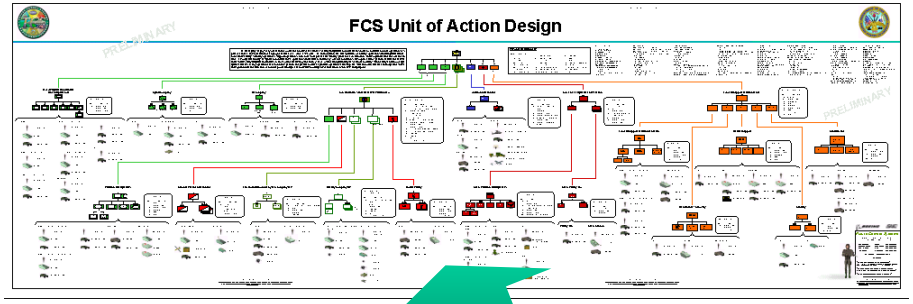
Phenomenology & Physical Processes

FCS ACE DPD

Platform Characteristics and Capabilities

Distributed Product Description (DPD) Approach

DPD Provides Basis for FCS M&S



M&S (IPT)

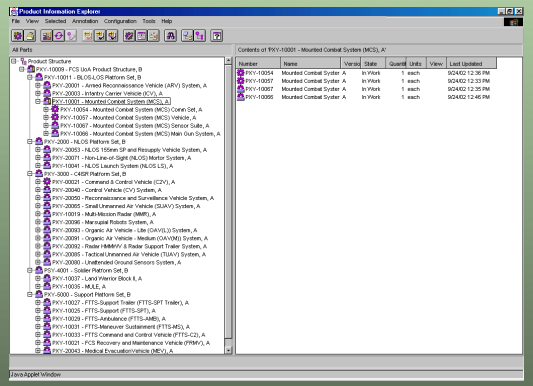
FCS ACE (Windchill™)

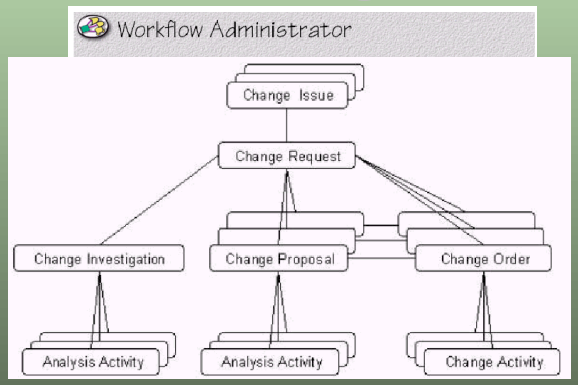
FCS ACE DPD

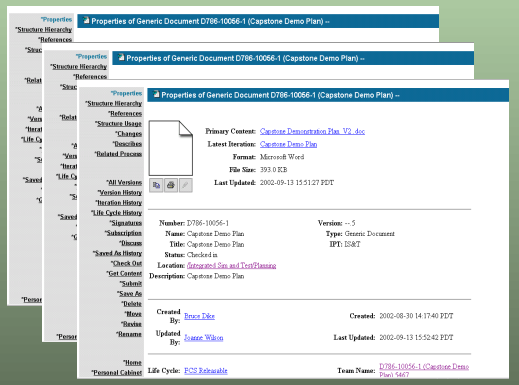
FCS Product Structure

M&S Management

M&S Objects





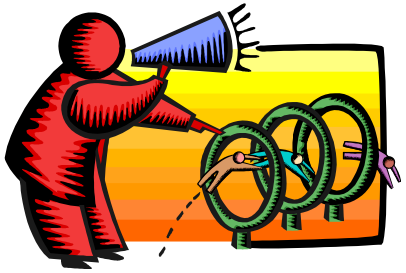


Top Level DPD Use Cases

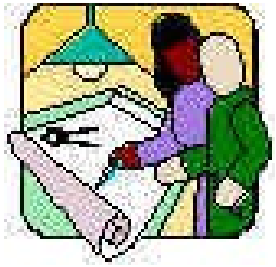
IPT Managers
- Study Planning
- Task Coordination
- Decision
- Collaboration

M&S Analysts
- Data Pedigree
- Analysis Linkage
- Boxed Sets

FCS Distributed Product Description (DPD)



Govt. Reviewers
- Accreditation
- Certification
- Evaluation



Design Engineers
- Product Linking
- Design Views
- Reference Data

Product Data Teams
- Requirements
- Spec Development
- Data Integration

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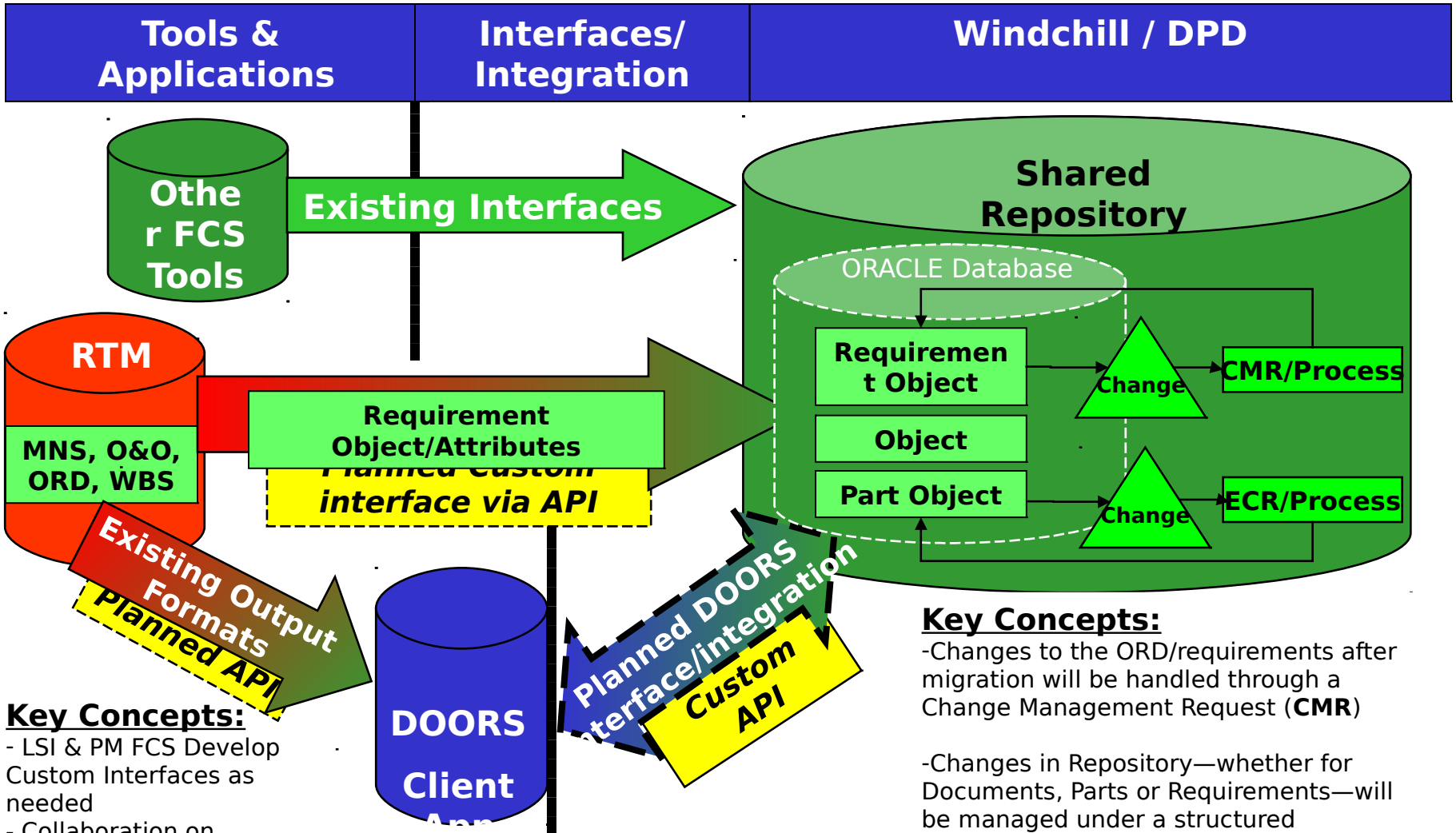
FCS ACE:
Traceability of Requirements to Products



Key Concepts:
- LSI & PM FCS Develop Custom Interfaces as needed
- Collaboration on requirements **MUST** be linked to "live" Database

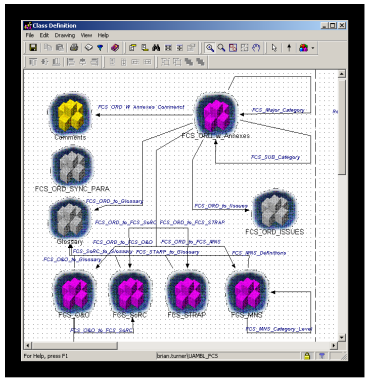
Note: RTM – to - DOORS and DOORS - to– Windchill interfaces are not in place as of 01/2003

Key Concepts:
-Changes to the ORD/requirements after migration will be handled through a Change Management Request (**CMR**)

-Changes in Repository—whether for Documents, Parts or Requirements—will be managed under a structured configuration mgmt process.

FCS ACE: Traceability of Requirements to Products

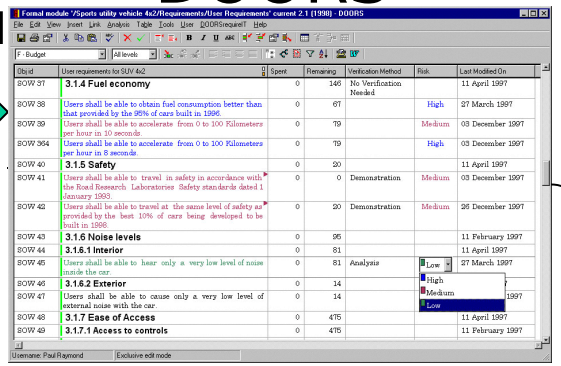
RTM



MNS, SoRC, O&O, ORD, WBS

Published

DOORS



System Design Specs

Lifecycle
"Traceability"
of More than
Requirements,
but also to
Design and M&S

Published

Published

FCS System & Concept Structure

View in ProductView

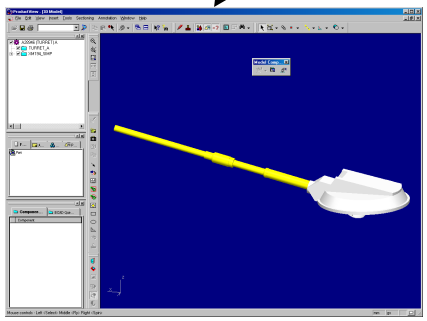
- A28946 TURRET A
  - A704537 XM194_SIMP 1 each A
    - A897804 X194RECOIL 1 each A
      - A357364 BREECH_BLOCK 1 each A
      - P649047 XM194_TUBE_BREECH 1 each A
    - P780424 XM194NON_RECOIL 1 each A
  - P111515 TURRET_A 1 each A

ProductView

ProjectLink

Published

Enterprise

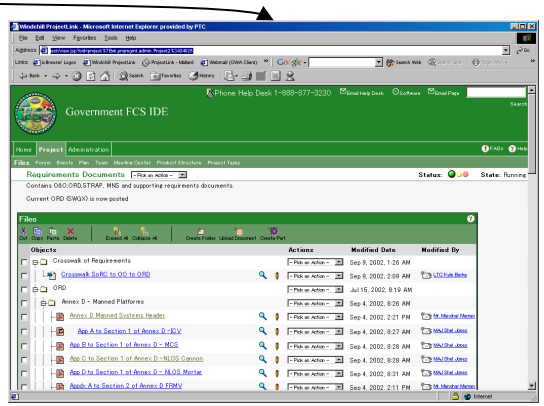


3D CAD Model View

Location: /Visualization Demonstration/Turret/Sample Req
Created: 2002-10-04 11:06:41 EDT

Name	Number
NLOS Cannon Requirements Annex D	213241
All Versions Check Out Get Content Save As Submit	
NLOS Requirements Project	432432
All Versions Check Out Get Content Save As Submit	

Linked Data Structure View



IPT Project View

Topics for Discussion

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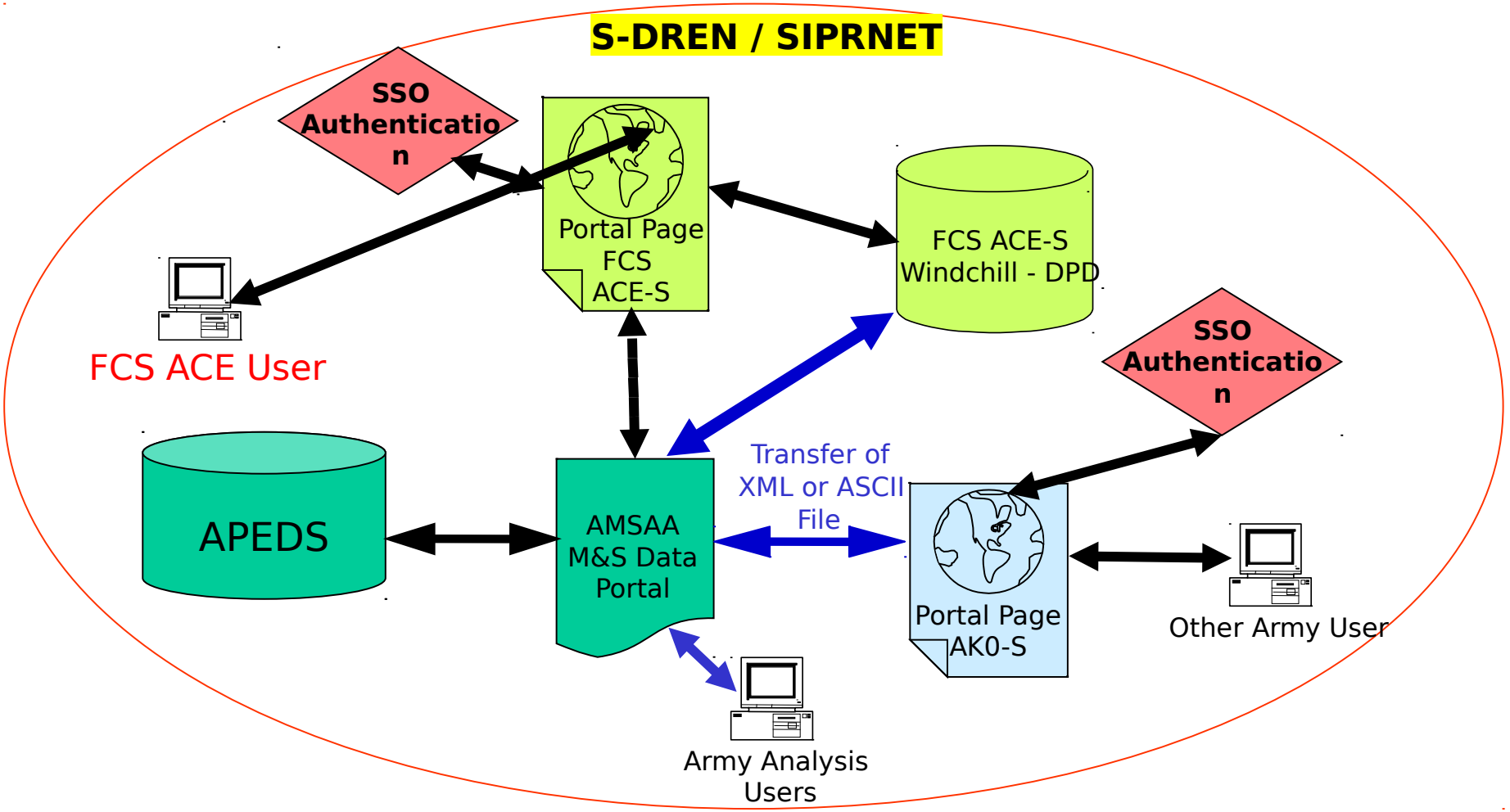
Integration to AMSAA M&S Data Portal

High-Level Concept

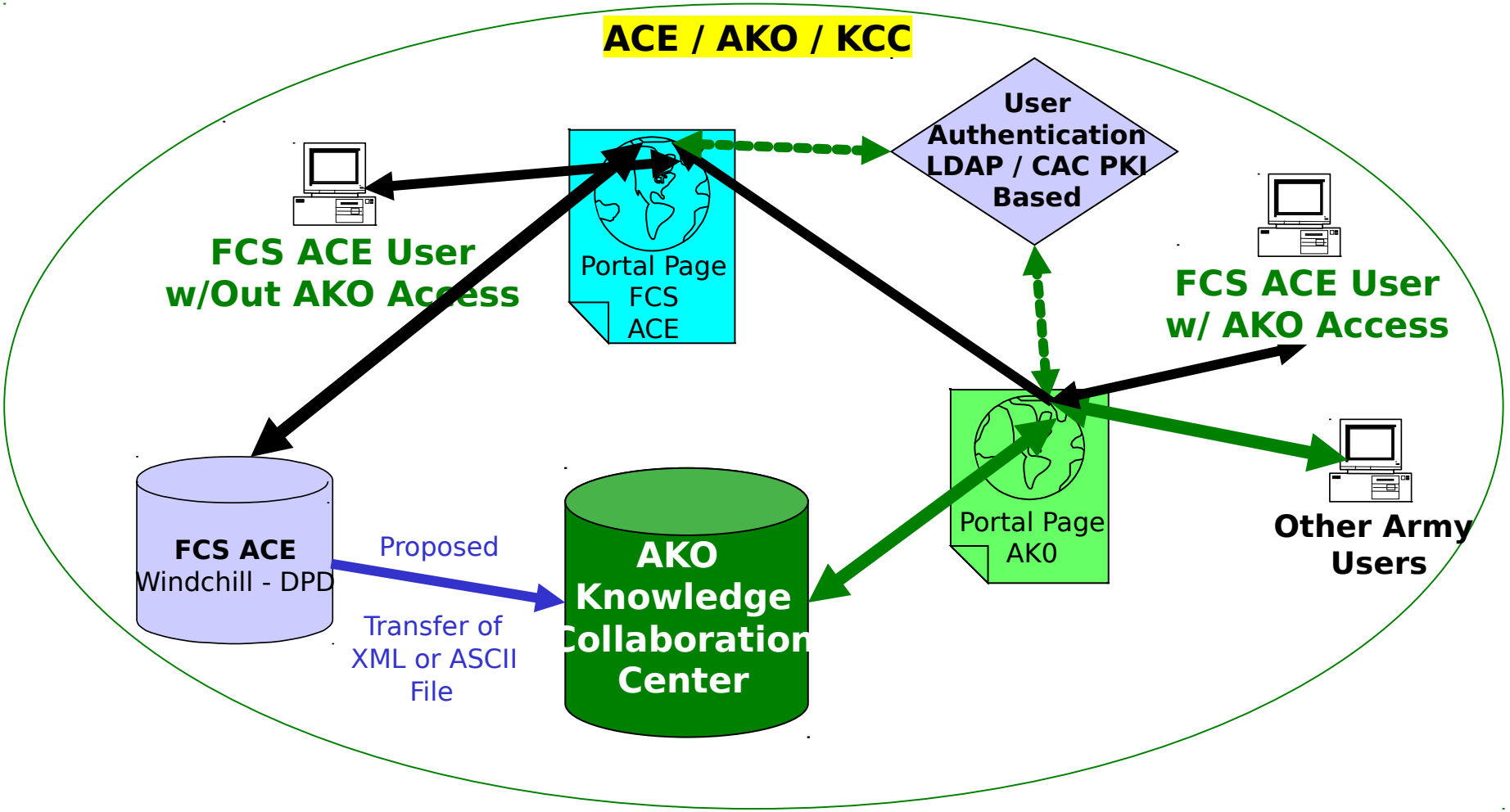


Overview of ACE / AMSAA Integration Approach

- **FCS ACE Users access APEDS data via AMSAA's M&S Data Portal.**
- **AKO-S will be used as a common authentication tool for Government-hosted ACE applications—just as FCS has done with AKO.**
  - **APEDS M&S Data Portal produces an XML file which will be imported to FCS ACE-S Windchill**
  - **E-mail notification of data changes go to the user's classified e-mail account (or turned off).**
  - **A Windchill custom document object will be created to handle these requests so we can segment the data in the database.**

Integration to AKO & Knowledge Center

High-Level Concept


ACE / AKO / KCC
User Authentication LDAP / CAC PKI Based
FCS ACE User w/Out AKO Access
Portal Page FCS ACE
FCS ACE User w/ AKO Access
FCS ACE
Windchill - DPD
Proposed
Transfer of XML or ASCII File
AKO Knowledge Collaboration Center
Portal Page AK0
Other Army Users

Summary

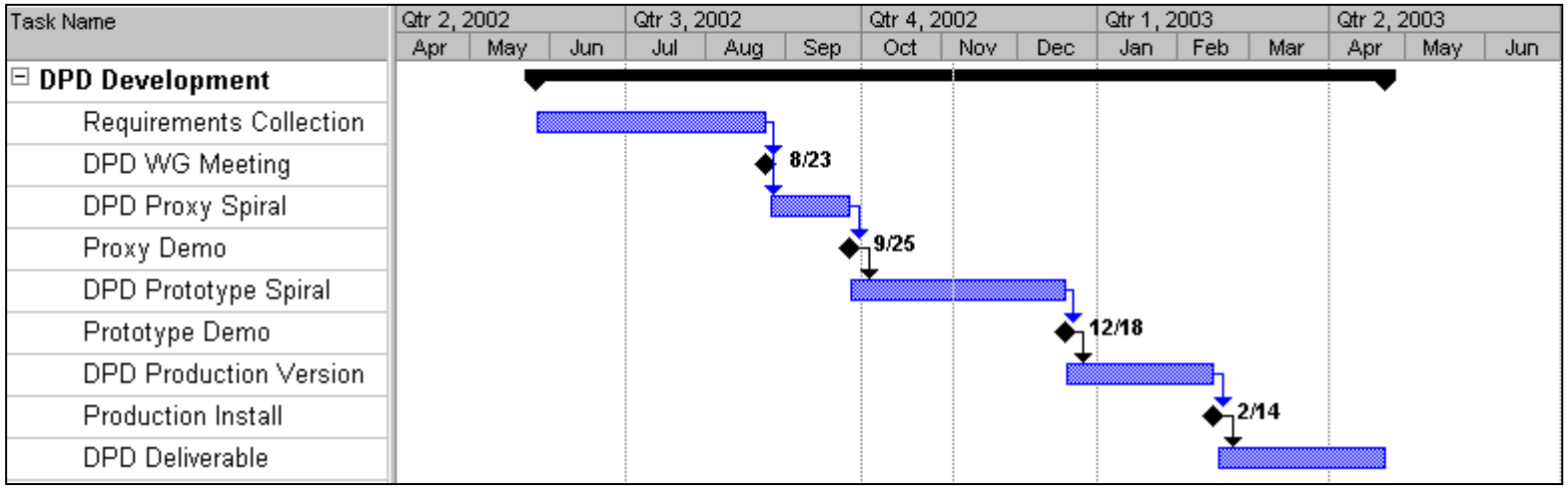
- **SMART framework is instantiated within FCS ACE**
- **ACE DPD will be single authoritative voice for FCS description data**
- **PM FCS-Sim supports AMSAA Data Portal development and has full integration capability with the FCS ACE**
- **Ability to integrate data sources through common access process and *does not* depend on common location**

***Live* FCS ACE Demonstration**

Backup slides

DPD Development Schedule CTD

- **Spiral Development Plan of DPD**
  - **Spiral 1 Proxy 25 Sep**
  - **Spiral 2 Prototype 17 Dec**
  - **Spiral 3 Production 14 Feb**
- **Separate Integration, Test, & Production SW Environments Enable Concurrent Development**



Distributed Product Description (DPD)

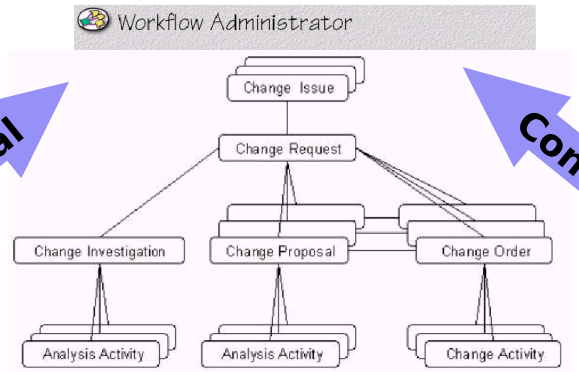
- **Current Demo Version**
  - Built with ACE Windchill
  - FCS Unit of Action Part Structure Representation
  - Change Management Links and M&S Workflow
  - LSI Analysis Activity Collaboration and Linkages
  - M&S SIMEX Object Placeholders
  - Change Notification Events (Dependency Links to Products)
  - Boxed Set Relationships
- **Prototype Version - 17 Dec 02**
  - Uses Modified ACE Windchill
  - Runs on Dedicated Machine on BACE Network
    - Accessible by Government and LSI
  - Populated With Actual SIMEX Data

Distributed Product Description Plan Road Ahead

- **Prototype Development Cycle**
  - Confirm Initial Architecture Concept & Define Preliminary Design
  - Identify Risk Mitigation Alternatives
  - Utilize Full Set of Windchill Functions
  - Exercise and Benchmark with SIMEX Data (Dec 02)
  - Establish Detailed Plan for Production Development
  - Define SDD RFP Requirements
- **Production Development Cycle**
  - Validate Architecture and Formalize Final Design
  - Initiate Custom Development Tasks
  - Establish Links to Remote M&S Repositories
  - Benchmark and Release Initial Production Version (Feb 03)
  - Define SDD Development Plan
- **Assemble Deliverables**
  - Populate With CTD M&S Products
  - Develop Deployment Guidelines
  - Deliver to Customer (ASARC, DAB)

FCS DPD Relationships

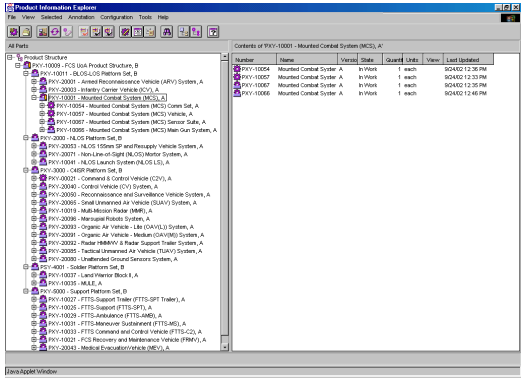
M&S Management



Change Proposal

Conduct Analysis

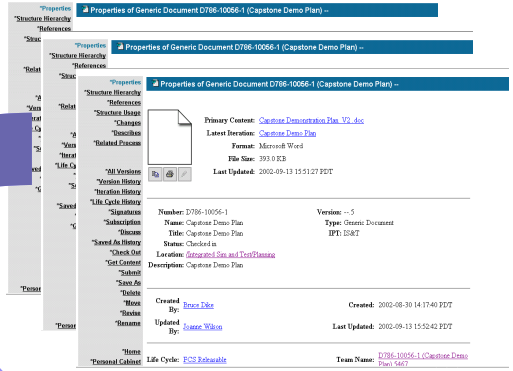
FCS Product Structure



Models / Modeled By

Uses / Used By

M&S Objects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Latest Iteration: Capstone Demo Plan
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Number: D786-10056-1
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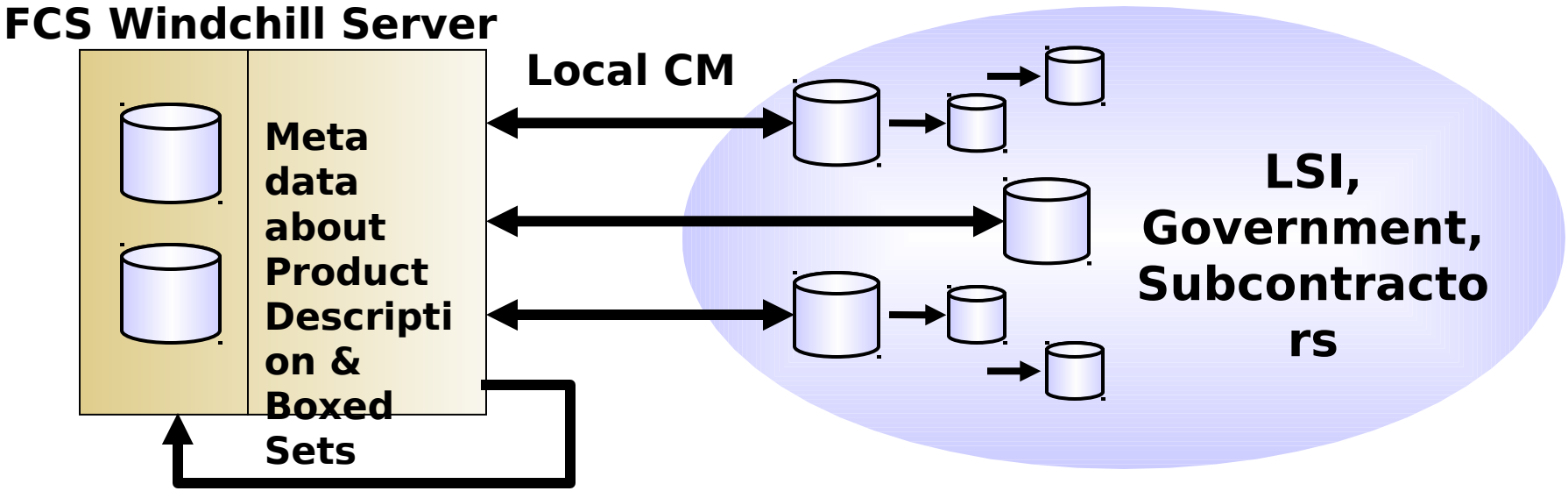
Title: Capstone Demo Plan
Status: Checked in
Location: Integrated Sys and Test/Planning
Description: Capstone Demo Plan
Version: -- 5
Type: Generic Document
IPT: IS&T
Created By: Bruce Dice
Created: 2002-08-30 14:17:40 PDT
Updated By: Joanne Wilcox
Last Updated: 2002-09-13 15:52:42 PDT
Life Cycle: FCS Releasable
Team Name: D786-10056-1 (Capstone Demo Plan) Gp7

Distributed Product Description Implementation



- Sole Authority for Data (single instance)
- ACE provides access management and data delivery
- Management of DPD use through workflows

Next Steps to Connect ACE / AMSAA

1. **Procure hardware and setup FCS ACE Windchill application in classified environment (Adelphi).**
2. **Implement AKO-S portal page and AKO-S common authentication (one password).**
3. **Develop minor customizations to import XML data files from M&S Data Portal into Windchill.**

✓ ALL Tasks within current capabilities (90 days)

✓ ALL Tasks will be coordinated for execution (AMSAA &